

Zeiss LSM 980



Installed 2020. Inverse point scanning confocal microscope with up to 6 channels (2 alkali PMT, 4 sensitive GaAsP detectors) and the Airyscan 2 detector for multiplexed super-resolution imaging. Spectral imaging (lambda scanning, emission fingerprinting) via sequential acquisition, transmitted light PMT and lasers to image all dyes from DAPI to Cy5. Multi-positioning (Piezo-driven XY stage with Z-Piezo top plate). Biophysical FCS analysis via photon counting modularity possible with dedicated water immersion objectives. (Last updated: Dec. 2020)

Stand

Zeiss Observer 7, inverse, fully motorized

Objectives

- EC Plan-Neofluar 2.5x/0.085 M27 (WD¹ 8.8 mm) – for sample navigation
- EC Plan-Neofluar 10x/0.3 M27 (WD 5.2 mm)
- LD LCI Plan-Apochromat 40x/1.2 Imm Corr DIC M27 (WD 0.41 mm) - immersion correction (silicone, glycerol or water), Airyscanning objective with ACR²
- Plan-Apochromat 40x/1.4 Oil DIC M27 (WD 0.13 mm)
- Plan-Apochromat 63x/1.4 Oil DIC M27 (WD 0.19 mm)
- C-Apochromat 40x/1.2 W Corr FCS M27 (WD 0.28 mm) – for FCS

On request

- C-Apochromat 10x/0.45 W M27 (WD 1.8 mm, ACR)
- LD LCI Plan-Apochromat 25x/0.8 Imm Corr M27 (WD 0.57 mm) - immersion correction for oil, glycerol or water
- α Plan-Apochromat 100x/1.46 Oil DIC M27 (WD 0.11mm) – Airyscanning objective

Lasers

- 405 nm laser diode (30 mW)
- 445 nm laser diode (30 mW)
- 488 nm laser diode (30 mW)
- 514 nm laser diode (30 mW)
- 561 nm DPSS laser (25 mW)
- 639 nm laser diode (25 mW)

Widefield illumination

- Colibri 7 (R[G/Y]B-UV), 4 excitation LEDs (385, 475, 555 and 630 nm)
- Halogen lamp (100 W)

¹ WD, working distance

² ACR, Automatic Component Recognition (the objective is automatically recognized by the software)

Filters (widefield illumination/viewing)

- Excitation filters (Colibri 7):
UV 385/30 (DAPI)
B 469/38 (GFP)
G/Y 567/100 (TRITC)
R 631/33 (Cy5)
- Reflector turret: Zeiss Filterset 109HE (DAPI/GFP/mCherry)
TFT 405/493/575, TBP 410-439/499-530/582-682

Detection systems

- Scanning mirrors with up to 8192 x 8192 pixels
- Confocal channels 1-6: slider-based system with free choice of channels (down to 3 nm)
Ch1, Ch2: alkali PMTs
Ch3-Ch6: GaAsP detectors (45% QE)
- Airyscan 2 (ChA): compound detector consisting of 32 GaAsP detector units
Secondary beam splitters: LP490, LP515, LP545, LP635, SP545, SP610
Clean-up filters:
BP420-480 + BP495-550
BP420-480 + BP570-630
BP420-500 + LP605
BP465-505 + BP525-585
BP495-550 + BP570-630
BP495-560 + LP660
BP570-620 + LP655
- T-PMT (ChD): transmitted light (alkali PMT)

XY-Stage

- ASI PZ-2150 scanning stage (xy travel range 120 x 110 mm), z-piezo top plate (with closed-loop servomotors, travel range 150 µm, 2.2 nm resolution)
- Standard inserts for slides, dishes and multiwell plates

Environmental control (stage top)

- Controller: Zeiss TempModule S, CO₂ Module S
- Stage insert: PeCon Heating Insert P LabTek™ S compact
- For 35 mm dishes, ibidi® slides and LabTek™ chambered cover glass

Software

- Zeiss ZEN 3.3 running on Windows 10 (64-bit). Modules:
 - Sample Navigator (creates sample overview with 2.5x)
 - Airyscan2 module including Multiplexing mode (4x or 8x parallelized acquisition)
 - Physiology package for Mean ROI analysis (e.g., for FRAP)
 - FRAP Efficiency Analysis (analysis of FRAP/FLIP data, curve fitting)

- Experiment Designer (for inhomogeneous experiment settings)
- Macro Environment (developer environment for Python scripting)
- Tiles and Positions (tiling and stitching module, includes large field focus correction)
- Counting (photon counting module for FCS applications)
- RICS (Raster Image Correlation Spectroscopy analysis)
- Direct Processing (pipeline for Airyscanning processing)
- 3DxI from Arivis (for visualization of 3D/4D datasets)